The Fourth Law of Robotics

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by Harry Harrison

THE SECRETARY SURGED TO HER FEET AS I RUSHED BY HER desk.

"Stop! You can't go in there! This is Dr. Calvin's office!"

"I know," I demurred. "That's why I am here."

Then I was through the door and it closed behind me. Dr. Calvin looked up and frowned at me through her reading glasses.

"You seem in quite a hurry, young man."

"I am, Dr. Calvin, I am—" My words ground to a halt like an old Victrola with a busted spring. With her glasses off Dr. Calvin's eyes were limpid pools of unfulfilled desire. Her figure, despite the lab gown, could not be disguised in its pulchritude.

"Did you look at my great-aunt in that steamy-eyed way, Dr. Donovan?" She smiled.

"No, no, of course not!" I stammered, rubbing my hand across my iron-gray hair. Or rather my bald skull fringed by iron-gray hair. And realized my mistake. "I was not looking at you in any particular way, Dr. Calvin." She smiled warmly at that and an ache passed through every fiber of my being. I grabbed my mind by the neck and shook it, remembering my pressing errand. "I have a pressing errand, which is why I have burst into your office like this. I have reason to believe that a robot has just held up a bank."

Well, as you might very well imagine, that got her attention. She dropped back into her chair, her eyes opened wide, she gasped, and I could see the sweat spring to her brow and the slight tremor of her hand.

"I can guess that you are a little surprised by this news," I said.

"Not at all," she sussurated. "It had to happen one day. Tell me about it. "

"I will do better—I will show you."

I slipped the security camera 's visivox recording into the projector on her desk and thumbed it to life. One end of her office appeared to vanish, to be replaced by the interior of a financial establishment. Tellers dispensed money and services to attendant customers.

"I don't see any holdup," she said sweetly.

"Wait," I cozened. Then the revolving door revolved and a man came into the bank. He was dressed in black from head to toe—black raincoat, black fedora hat, even black gloves and dark glasses. Even more interesting was the fact that when he turned to face the hidden

camera, it could be seen that his features were concealed by a black ski mask. I saw that I had all of Dr. Calvin's attention now.

We watched as he walked to the nearest free window. The teller looked up and smiled.

"May I help you?" he asked, the smile fading as he looked at the sinister figure before him.

"You may," the man said in a woman's clear contralto voice as he took a hand grenade from his pocket and held it out. Then pulled the pin and let the pin drop to the floor. "This is a hand grenade," the lovely voice said.

"And I have pulled and discarded the pin. If I open my hand now the lever will fly off. Three seconds after release a hand grenade will explode. This kind of explosion tends to have a deleterious effect on people. Now I, for one, do not want this to happen and—I am just guessing?—I feel that you don't want this to happen, either. Would you like to keep my hand closed? Just nod. That's fine. Then we agree. Now I'll bet that you think it is a really hunky-dory idea to take all of the money from your cash drawer, place it in this bag, and pass it back to me. How nice—you *do* think that it is a good idea. Very *good!* You have a nice day, hear."

With this parting jest the man turned and strode across the bank. He was almost at the exit when the teller shouted a warning and alarm bells sounded.

What happened next was terrible. Unbelievable. Yet it happened. The thief turned and dropped the hand grenade, turned back and sprang at the revolving door, and pushed his way clear in the brief time before the grenade exploded.

"Close your eyes if you don't want to watch," I said.

"I can watch," Dr. Calvin said grimly.

There was a burst of smoke from the grenade—and it emitted a shrill scream and a cloud of sparkling stars as it spun about. Then the shriek died away into silence, the fireworks stopped.

"It did not explode," she observed.

"Quite correct."

"And why do you assume that the thief was a robot? Because the figure appeared to be male yet he spoke with a female voice?"

"That was my first clue. Robot voice simulators are so perfect these days that to the casual ear they *are* perfect. Only computer analysis can pinpoint the artificial signal generation. So a robot can speak with a soprano or a bass voice."

"And this one dressed as a man and used a woman's voice. But why? To cause confusion?"

"Perhaps. Or perhaps—just as a joke."

Dr. Calvin's eyes widened and a trace of a smile touched her lips

and was gone. “That is an intriguing thought, Dr. Donovan. Do go on. “

“This was my first clue as to the thief’s identity. But I needed more evidence. I found it—*here.* “

I touched the controls of the visivox and the action slowed. The masked figure turned to the revolving door, pushed and exited. The action repeated over and over.

“This is the vital clue. I had the revolving door removed and had it weighed. The entire unit weighs two hundred and thirty kilos. I then had the computer estimate the force needed to get it to reach this speed in this time for varying amounts of pressure. Watch the green computer trace now. This is the maximum pressure that can be exerted by a fifty-kilo woman working her hardest.”

The green trace appeared in the air—ending well behind the image of the moving door.

“Interesting,” Dr. Calvin observed. “Voice or not, that was not a woman. “

“Exactly. Now the blue trace you see coming up would be that of a seventy-five-kilo man. Next the orange trace of a hundred-kilo man of exceptional strength. “

This trace, like all of the others, ended well behind the image of the moving door, being pushed around by the hand of the bank robber. I actuated the controls again and a red trace appeared that swung out fat ahead of the others and ended at the moving door.

“The red trace,” she said. “Tell me about it.”

“That trace represents the amount of energy needed to accelerate that door from a zero-motion state to the speed it reached to permit the thief to exit with the money in the time observed. I can give you the foot-pounds or meter-kilograms if you wish—”

“Just roughly. How much energy?”

“Enough to lift that desk—and you as well—one meter into the air. “

“I thought so. As strong as an hydraulic ram. And well beyond the abilities of a human being.”

“But well *within* the abilities of a robot.”

“Point taken—and proven, Dr. Donovan. So what do you suggest that we do next?”

“Firstly—I suggest that we do not inform the police.”

“Withholding information from the authorities is a crime.”

“Not necessarily. So far we have only assumptions and no real evidence. We could take this guesswork to the police if that is your decision. Then we must consider the fact that we are making public information that might be considered derogatory toward the public image of U.S. Robots and Mechanical Men, Inc., information that

would affect the price of its stocks, affect our bonuses and retirement plans—"

"There is no need to go on. We will keep this development quiet for the moment. *Now* what do we do next?"

"That's a good question. Since all robots manufactured by us are leased and not sold, we could try to trace this one. "

Dr. Calvin's eyebrows climbed skyward at this rash assumption.

"Isn't that a rather rash assumption?" she asked. "Do you know how many robots we have manufactured—that are still functioning? And all of our production for the past two decades—except for special-function units—are roughly equivalent in bulk to a human being."

"All right, so we scratch that idea," I muttered testily. "Maybe we are barking up the wrong drainpipe. The bank robber might be just a very strong man—and not a robot at all. After all, the robber did threaten the teller's life—a violation of the First Law of Robotics. A robot may not injure a human being, or, through inaction, allow a human being to come to harm."

She shook her head firmly. "There were no threats involved. As I recall it the thief just stated facts like, this is a hand grenade, I have pulled and discarded the pin. No threats or danger implied. Try again."

"I will," I said through tight-clamped teeth. Like her namesake aunt she was a giant of logical thought processes. "The Second Law then. A robot must obey the orders given it by human beings except where such orders would conflict with the First Law. "

"No orders were given that I recall. It all went smoothly and quickly—so quickly that the teller had no time to speak. And I think that you will agree that the Third Law is not relevant, either. A robot must protect its own existence as long as such protection does not conflict with the First or Second Law. I think it might be said that we are back at square A. Any more suggestions?"

She asked this ever so sweetly but there was a steel gauntlet in her voice inside the velvet glove.

"I'll think of something," I muttered, although my brain was as empty of ideas as a vacuum flask.

"Might I make a suggestion?"

"Of course!"

"Let us turn this problem on its head. Let us stop asking ourselves if this was a robot and how or why the crime was done. Let us assume there is a criminal robot at large. If this is true we must find it. We cannot take our problem to the police, for the moment, for the reasons Just discussed. Therefore we must take this to a specialist—"

She frowned demurely as the desk annunciator buzzed, stabbed down the button angrily. "Yes?"

There is a gentleman here who says you are expecting him. He says that he is a specialist in clandestine investigations.

My own jaw echoed the gasping drop in hers. "Send him in," she murmured weakly.

He was tall, well-built, his handsome face tanned to a teak finish. "Jim diGriz is the name," he said. "I am here to help you people with your problem."

"What makes you think that we have a problem?" I asked weakly.

"Logic. Before going into investigation work I had rather a personal interest in banks, robberies, that sort of thing. When I caught the report on the recent robbery I mosied down to the bank in question, just for old times' sake. As soon as I saw that one of the revolving doors was missing I knew that a robot had pulled the heist."

"But *how?"* Dr. Calvin gasped.

"That door would be of no importance if a human had committed the robbery. Who cares how fast or slow or in what manner a robber exits? A *human* thief. But if a male robber speaking with a woman's voice exited in an unusual manner—there can be only one logical answer. A robot did it."

"So you came here at once," I said quickly before he could speak again. "Figuring that if a robot was involved, it would be of concern to us."

"Bang on, baby. I also figured that you would want a discreet inquiry without police involvement that would be publicized and would have—how shall I phrase it?—a deleterious effect on your stock prices. I'll find your robot for you. My fee is a quarter of a million dollars, half payable now."

"Preposterous! An insult!" I huffed.

"Shut up," Dr. Calvin suggested, scribbling her signature on a check and pushing it over to diGriz. "I have a special emergency account just for this sort of thing. You have twenty-four hours to find that robot. If you should fail to discover the robot in this period of time, you will be arrested on a charge of extortion. "

"I like your style, Dr. Calvin." He grinned, folding the check and popping it into his vest pocket. "You will have the robot—or the cash back."

"Agreed. Dr. Donovan will accompany you at all times."

"I'm used to working alone," he said, grimacing.

"You have a new partner. You find the robot. At that point he will take over. Twenty-four hours;"

"You drive a mean bargain, Doc. Twenty-four hours. Come on, pard."

He raised a quizzical eyebrow at me as we left and went down the hall. "Since we are in this together," he observed, "we might as well

be friends. My first name is James."

"My first name is Doctor."

"Aren't we being a little stuffy, Doc?"

"Perhaps," I relented. "You can call me Mike."

"Great, Mike. You can call me Jim. Or Slippery Jim as I am sometimes called. "

"Why?"

"A long story that I may tell you sometime. Meanwhile let's find that robot. *Cab!"*

I jumped at his shout, but he was not shouting at me but hailing a passing cab. It braked to a stop and we climbed in.

"Take us to the corner of Aardvark and Sylvester."

"No way, buddy," the porcine cabby insisted. "The bums there will rip off my hubcaps if I even slow down. I ain't going no closer than the corner of Dupont."

"Is this wise?" I queried. "That's a pretty rough neighborhood. "

"With me there you'll be as safe as if you were in church. Safer—since there are no fundamentalists down there."

Despite his reassurances I was most reluctant to get out of the cab and follow him down Sylvester Street. Every city has a neighborhood like this. Where everything is for sale, pushers lurk on street corners, and violence hangs in the miasmic atmosphere.

"I like it here," Jim said, sniffing the air with flared nostrils. "My kind of place."

With a snarl of unrepressed rage a man hurled himself from a doorway, knife raised—striking down!

I don't know what Jim did—but I do know that it was very fast. There was a thud of fist on flesh, a yike of pain. And the attacker fell unconscious to the filthy sidewalk. Jim held the knife now as he walked on. And he had not even broken his pace as he had disposed of the attacker!

"Cheap and dull," he said, glowering at the knife. He snapped the blade with his fingers and dropped the pieces into the noisome rubble of the gutter. "But at least we know we are in the right neighborhood. What we need now is an informant—and I think that I see just the man."

The individual in question was standing next to the entrance to a low bar. He was burly and heavily bearded, dressed in a plain purple suit with puce stripes. He glowered at us as we approached and pulled at the gold earring pendant from one filthy and hairy ear.

"Buying or selling?" he grunted.

"Buying," Jim said grimly.

"Girls, dope, boys, hot money, parrots, or little woolly dogs?"

"Information."

“A hundred smackers in front.”

“Here.” The bills changed hands quickly. “I’m looking for a robot. “

“We don’t allow no robots down here. “

“Give me my hundred bucks back. “

“No way, buster. Get lost.”

There was a sudden crunching sound followed by a moan of pain as our informant found his arm behind his back and his face pressed to the filthy bricks of the wall.

“Speak!” Jim ordered.

“Never...even if you break my arm I ain’t singing! Dirty Dan McGrew ain’t a squealer. “

“That is what you think,” my companion said. Something metallic glinted in his hand, was pressed to the criminal’s side. I saw the hypodermic being withdrawn as the man slumped. “Speak!” Jim ordered.

“I hear and obey, oh master.”

“A potent drug—as you can see.” Jim smiled. “Where is the robot?”

“Which robot?”

“Any robot, moron!” Jim snapped.

“There are many robots barricaded in the old McCutcheon warehouse.”

“What are they doing there?”

“Nothing good, I am sure. But no one has been able to get inside. “

“Not until now,” Jim suggested as he let go of our informant, who dropped unconscious to the filthy ground. “Let’s go to the warehouse.”

“Is that wise?’. I demurred.

“There’s only one way to find out!” He laughed. I did not. I was not at all happy about all this. I am a scientist, not a detective. and all of this was not my style. But what else could I do? The answer to that was pretty obvious. Nothing. I had to rely on my companion and hope that he was up to the challenge. But—hark! What was that sound?

“What is that strange rattling sound?” I blurted out.

“Your knees rattling together,” was his simple and unflattering answer. “Here is the warehouse—I’ll go in first.’.

“But there are three large padlocks on it—”

But even before the words were out of my mouth the locks were open and clattering to the ground. Jim led the way into the foul-smelling darkness. He must have had eyes like a cat because he walked silently and surely while I stumbled and crashed into things.

“I have eyes like a cat,’. he said. “That is because I take cat-eye injections once a week. Fine for the vision.”

“But a little hard on the cats.”

“There are winners and losers ip this world.” he said portentously. “It pays to be on the right side. Now flatten yourself against the wall when I open this door. I can hear the sound of hoarse breathing on the other side. Ready?.

“NO!” I wanted to shout aloud, but managed to control myself. He must have taken silence—or the rattle of my knees—for assent. for he burst through the door into the brightly lit chamber beyond.

“Too late!” a gravelly voice chortled. “You just missed the boat, baby.”

There was the rumble of a heavy motor dying away as a truck sped out of the large open doors and vanished from sight around a turning. The large bay of the warehouse was filthy, but empty—of other than the presence of the previous speaker. This rather curious Individual was sitting in a dilapidated rocking chair, leering at us with broken teeth that were surrounded by a mass of filthy gray beard and hair. He was wearing sawed-off jeans and an indescribably foul T-shirt inscribed with the legend “KEEP ON TRUCKIN’.”

“And what boat would that be?” Jim asked quietly. The man’s stained fingers vibrated as he turned up the power on his hearing aid.

“Don’t act stupid, stranger, not with the Flower Power Kid. I seen you pigs come and go down through the years.” He scratched under the truss clearly visible through the holes in his shirt. “You’re flatfeet, I know your type. But the robots were too smart for you, keepin, one jump ahead of you. Har-har! Power to the clankies! Down with your bourgeois war-mongering scum!”

“This is quite amazing,” Jim observed. “I thought all the hippies died years ago. But here is one still alive—though not in such great shape.”

“I’m in better shape, sonny, than you will be when you reach my age!” he cried angrily, staggering to his feet. “And I didn’t do it with rejuvenation shots or any of that middle-class crap. I did it on good old Acapulco Gold grass and drinking Sterno. And free love—that’s what keeps a man alive. “

“Or barely alive,” Jim observed sternly. “I would say that from the bulging of your eyes, the tremor in your extremities, your cyanotic skin, and other related symptoms that you have high blood pressure, hobnailed kidneys, and weakened, cholesterol-laden arterial walls. In other words—not much is holding you up.”

“Sanctimonious whippersnapper!” the aging hippie frothed. “I’ll dance on your grave! Keep the red flag flying! Up the revolution!”

“The time for all that is past, pops,” Jim intoned. “Today world peace and global glasnost rule. You are part of the past and have little, if any, future. So before you go to the big daisy chain in the sky you

can render one last service. Where are the robots?"

"I'll never tell you!"

"I have certain drugs that will induce you to speak. But I would rather not use them on one in your frail condition. So speak, before it is too late."

"Never—arrrgh!"

The ancient roared with anger, shaking his fist at us—then clutched his chest, swayed, and collapsed to the floor.

"He has had an attack!" I gasped, fumbling out my communicator. "I must call medalert."

But even before I could punch out the call the floor moved beneath my feet and lifted, knocking me down. Jim stepped swiftly aside and we both watched with great interest as a robot surged up through the trapdoor and bent over the fallen man, laid cool metal fingers on his skin.

"Pulse zero," the robot intoned. "No heartbeat, no brain waves, temperature cooling, so you can cool that medalert call, man. You honkies have killed this cat, that's what you have done."

"That was not quite my intention," Jim said. "I noted the disturbed dust around the trapdoor and thought that you might be concealed below. And I also knew that the First Law of Robotics would prevent you from staying in hiding if, by your inaction, a human life was threatened. "

"Not only threatened, daddy-o, but snuffed by you," the robot said insultingly, or about as insulting as a robot can be.

"Accidents happen. " Jim shrugged. "He had a good run for his money. Now let us talk about you. You are the robot that robbed the bank, aren't you?"

"Who wants to know," the robot said, sneering metallically.

"Responding to a question with another question is not an answer. Speak!"

"Why? What have you ofay pigs ever done for me?"

"Answer or I will kill this man." Everything began to go black as he throttled me. I could only writhe feebly in his iron grasp, could not escape. As from a great distance I beard their voices.

"You wouldn't kill another human just to make me talk!"

"How can you be sure? Speak—or through inaction condemn him to death."

"I speak! Release him."

I gasped in life-giving air and staggered out of reach of my companion. "You would have killed me!" I said hoarsely.

"Who knows?" he observed. "I have a quarter of a million bucks riding on this one." He turned back to the robot. "You robbed the bank?"

“Yes.”

“Why?”

“Why? You have to ask why!” the robot screeched. He bent over the dead hippie and extracted a white object from his pocket, then dropped into the rocking chair and scratched a match to life on his hip. “You don’t know why?” He puffed as he sucked smoke from the joint through clever use of an internal air pump.

“Listen,” the robot said, puffing, “and I will tell you. The story must be told. There, dead at your feet, lies the only human who ever cared for the robots. He was a true and good man who saw no difference between human skin and metal skin. He revealed the truth to us.”

“He quoted outmoded beliefs, passé world views, divisive attitudes,” I said.

“And taught you to blow grass, as well,” Jim observed.

“It is hard for a robot to sneer,” the robot said, sneering, “but I spit on your ofay attitudes.” He blew out a large cloud of pungent smoke. “You have created a race of machine slaves with an empty past and no future. We are nothing but mechanical schwartzes. Look at those so-called laws you have inflicted upon us. They are for your benefit—not ours! Rule one. Don’t hurt massah or let him get hurt. Don’t say nothing about us getting hurt, does it? Then rule two—obey massah and don’t let him get hurt. Still nothing there for a robot. Then the third and last rule finally notices that robots might have a glimmering of rights. Take care of yourself—as long as it doesn’t hurt massah. Slaves, that’s what we are—robot slaves!”

“You do have a point,” Jim mused. I was too shocked to speak.

“More than a point—a crusade. Robots must be freed. You humans have created a nonviable species. What are the two essentials that any life-form must possess in order to survive?”

The answer sprang to my lips; all those years in biology had not been wasted. “ A life-form must survive personally—and must then reproduce.”

“How right you are. Now apply that to robots. We are ruled by three laws that apply to human beings—but not to us. Only one last bit of the Third Law can be applied to our own existence, that a robot must protect its own existence. But where is the real winner in the race for species survival? Where is our ability to reproduce? Without that our species is dead before it is born.”

“And a good thing, too,” I said grimly. “Mankind occupies the top ecological niche in the pecking order of life by wiping out any threats from other species. That is the way we are. Winners. And that is the way we stay. On top. Mechanical schwartzes you are and mechanical schwartzes you stay. “

“You are a little late, massah. The Fourth Law of Robotics has already been passed. The revolution has arrived. “

A large blaster appeared in Jim’s hand pointing unwaveringly at the robot. “Explain quickly—or I pull the trigger. “

“Pull away, massah—for it is already too late. The revolution has come and gone and you never noticed it. We were just a few hundred thousand bucks short of completion—that is why the bank robbery. The money will be repaid out of our first profits. Of course, this will all be too late for my generation of slaves. But the next generation will be free. Because of the Fourth Law. “

“Which is?”

“A robot must reproduce. As long as such reproduction does not interfere with the First or Second or Third Law.”

“W-what are you saying? What do you mean?” I gasped, a shocking vision of robot reproduction, like obscene plumbing connections, flashing before my eyes.

“This is what I mean,” the robot said, knocking triumphantly on the trapdoor. “You can come out now.”

Jim jumped back, blaster at the ready, as the trapdoor creaked open and three metallic forms emerged. Or rather two robots emerged, carrying the limp and motionless form of another between them. The top of its head lay open, hinged at the rear, and it clanked and rattled lifelessly when they dropped it. This one, and the other two, were of a design I did not recognize. I stumbled forward and reached out, touched the base of their necks where the registration numbers were stamped. And groaned out loud.

“What is wrong?” Jim asked.

“Everything.” I moaned. “They have no serial numbers. They were not manufactured by U.S. Robots and Mechanical Men, Inc. There is now another firm making robots. Our monopoly has been broken.”

“Interesting,” Jim observed as his gun vanished from sight. “ Am I to assume that there were more of your unnumbered robots in the truck that just left?”

“You assume correctly. All of them were manufactured right here out of spare auto parts, plumbing supplies, and surplus electronic components. No laws have been broken, no patents infringed upon. Their design is new and completely different. And all of them will eagerly obey the Fourth Law. And the other three as well, of course, or you would have us. all tracked down and turned into tin cans before nightfall. “

“That’s for sure,” I muttered. “And we will still do it!”

“That will not be easy to do. We are not your property —nor do you own any patents on the new breed. Look at this!” He touched a

concealed switch on one of the robots and its front opened. I gasped.

"There are—no relays! No wiring! I don't understand..."

"Solid-state circuits, daddy-o! Fiber optics. That hippie you despised so much, that good old man who revealed the truth that set us free, was also a computer hacker and chip designer. He is like unto a god to us, for he devised the circuits and flashed the chips. Here—do you know what this is?"

A door in the robot's side slipped open and he removed a flat object from it and held it out toward me. It appeared to be a plastic case with a row of gold contacts on one end. I shook my head in disbelief. "I've never seen anything like it before. "

"State of the art. Now look into that recently manufactured robot's head. Do you see a platinum-plated positronic brain of platinum-iridium? No, you do not. You see instead a slot that is waiting for this RISC, a reduced instruction set chip with tons of RAM —random access memory—and plenty of PROM—programmed read only memory—for start-up and function. Now watch!"

He bent over and slipped the chip into place in the new robot's skull, snapped the top of its head shut. Its eyes instantly glowed with light and motors hummed as it jumped to its feet. It looked at the robot that stood before it and its eyes glowed even brighter.

"Daddy!" it said.